

30 January 2004

Sue Chate
Executive Officer
NSW Scientific Committee
C/O National Parks and Wildlife Service
PO Box 1967
HURSTVILLE NSW 2220

Dear Ms Chate

Re: NSW Scientific Committee proposal to list Herbivory and Environmental Degradation caused by Feral Deer as a 'Key Threatening Process'

I have pleasure in submitting my comments on this proposal in the attached document.

After carefully examining of the Scientific Committee's preliminary determination, I believe there is no firm basis for approving the proposal to list 'herbivory and environmental degradation caused by feral deer as a key threatening process' at this time.

In accordance with the provisions of the NSW Privacy and Personal Information Protection Act, I request that my personal details remain confidential to the Scientific Committee and not released to the public.

For the purposes of demonstrating that I am qualified to comment on this proposal, I have relevant qualifications (BSc.) and practical experience in biological research and ecological methods. I have participated in ecological surveys (Blue Mountains National Park, Fowler's Gap research station, Mootwingee National Park).

As a former employee of the Australian Museum and the NSW Department of Agriculture I participated in scientific field work, including surveys of plants, birds and mammals in the State forests of south east NSW, Seal Rocks (VIC) and Eungella National Park (QLD).

I have research experience (and publications) on the ecology, biology and life-cycles, and abundance and distribution investigations of agricultural pests.

I look forward to seeing the outcome of the Scientific Committee's decision.

Yours sincerely

Stephen Larsson

Attach. Comments on Scientific Committee Proposal (6 copies)

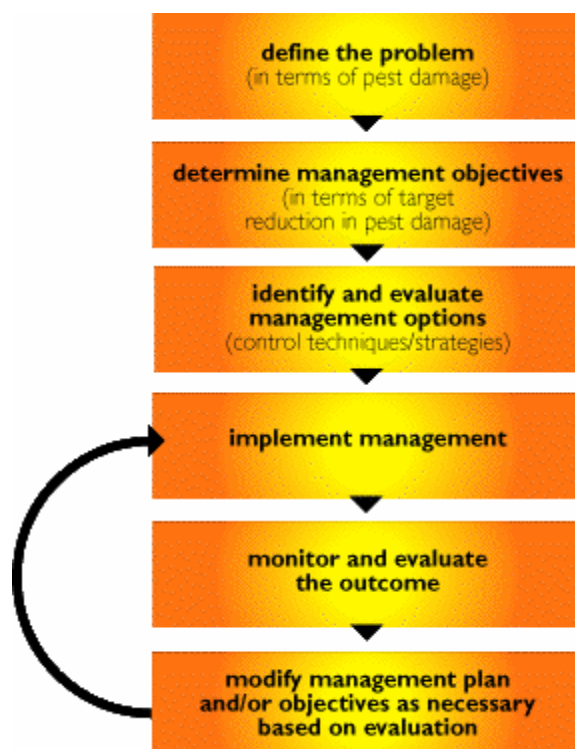
Submission commenting on the NSW Scientific Committee Preliminary Determination to support a proposal to list Herbivory and Environmental Degradation caused by feral deer as a Key Threatening Process

This (confidential) submission comments on the proposal by the NSW Scientific Committee preliminary determination to support a proposal to list 'herbivory and environmental degradation caused by feral deer as a key threatening process'.

General comments, focusing on the processes of the Scientific Committee preliminary determination are followed by specific comments on each of the 'findings' presented by the Scientific Committee in support of the proposal.

General Comments

In preparation of the preliminary determination the Scientific Committee has, from the outset, failed to adopt a strategic approach and apply the principles of best practice (Department of Agriculture Fisheries and Forestry (affa), Braysher 1992, English 2002 and Hart 2002).



Define the Problem

The most important and essential first step in pest management programs is a thorough definition of the true problem and a clear understanding of the levels of pest impact (Braysher 1992, Department of Agriculture Fisheries and Forestry (affa), English 2002, Hart 2002).

While the Scientific Committee acknowledges that impacts of feral deer on indigenous biota have been poorly studied, it has defined the problem (*herbivory and environmental damage caused by feral deer*) in terms of the presumed cause, "feral

deer" in isolation. It has failed to consider the *other* contributing factors such as other feral species (rabbits, pigs etc.) and anthropogenic factors (habitat disturbance, weed

invasion, recreational vehicle use etc.). This 'single-species' management approach instead of a more holistic approach is inconsistent with 'best practice' (Hart 2002).

English (2002) emphasises that it should be a major imperative to clearly define the impacts of each major feral population. Proceeding directly to documenting the ecological aspects of environmental degradation, and pursuing a solution before clearly and correctly defining the real problem, is unlikely to meet with a long term solution.

It is readily apparent that the NSW Scientific Committee has failed to undertake a thorough problem definition in preparing its preliminary determination:

- The title of the preliminary determination "...*herbivory and environmental degradation caused by feral deer*" pre-supposes that the problem is in fact, feral deer (alone) and the focus is clearly on the problem, feral deer.

'Best practice' pest animal management however involves identification of the actual, rather than the perceived problem(s) and then focusing on the impacts rather than on the pests themselves (Hart 2002).

Furthermore, it is important to recognize and fully appreciate the possibility that native animals may also be part of the problem (ie. be true pests) in certain situations (Hart 2002). Such a situation occurs with *Wallabia bicolor* in Royal National Park where, because of its dietary overlap with *Rusa* deer it is likely that *Wallabia bicolor* is partially responsible for the herbivory and environmental degradation.

- The Scientific Committee implies that high deer density locations in Royal National Park are causally associated with 30-70% fewer plant species.

However, in his study of *Rusa* deer in Royal National Park, Hamilton (1981) observed that at the 'high' deer density site (Era) there was higher plant species diversity at the Control (deer accessible) areas whereas there was lower plant species diversity in the Treatment (deer enclosure) areas (fig 4.8 in Hamilton). These observations led to the conclusion by Hamilton that deer are important in *maintaining* plant species diversity on grasslands.

It is intriguing that, on one hand the Scientific Committee (which contains two NPWS staff members) cite Hamilton's work in support of its preliminary determination, while on the other the NPWS Deer Management Plan for Royal National Park (2002) indicates that this information (i.e. Hamilton 1981) is now dated and of limited value. Which is it to be for Hamilton's work: accepted as supportive of the proposal, or dismissed as outdated and of limited value?

Determine Management Objectives

It is understood and appreciated that the Scientific Committee's preliminary determination is not meant to be a formal management plan. Nevertheless, it is disappointing that past operational mistakes by NPWS (English 2002) have been repeated in the current preliminary determination.

Although section 15 of the Threatened Species Conservation Act 1995 does not specifically require inclusion of 'management objectives' or 'expected outcomes' when proposing a key threatening process, I would have expected the preliminary determination to reveal evidence of a strategic approach by including an explicit statement of management objectives e.g. *"reduce susceptibility of the endangered / threatened species from any catastrophic event and localized extinction of the currently known populations."*

According to the NPWS website it appears that recovery plans for all of the endangered / threatened species mentioned in the preliminary determination have not yet been prepared (Recovery Plans, NPWS, last amended: 29 August 2003) despite the statutory requirement to do so. As indicated by English (2002) it should be a high priority that recovery plans are in place for threatened species.

If it is indeed correct that recovery plans are not yet in place, or at some final development stage for each of the endangered / threatened species referred to in the preliminary determination, then there is legitimate cause for grave concerns regarding priority setting procedures by NPWS.

Identify and Evaluate Management Options

Resource constraints and/or political pressure appear to have precluded even a brief exploration of possible alternative management options by the Scientific Committee.

Despite the Scientific Committee indicating that only biological and ecological factors can be taken into account, if there is to be any genuine success animal management programs need to be framed within a broader societal context (English 2002).

Regrettably, there are many relevant societal issues that will not even be submitted, let alone considered by the Scientific Committee. Interestingly, this has not deterred the Scientific Committee from listing several societal factors in its preliminary determination eg. cause damage to agricultural crops and harassment of stock (Finding 5).

Monitor and Evaluate the Outcome

Attempts to procure the 2003 Annual Report on the Deer Management Plan for Royal National Park through the NPWS library were not successful. Some five months (!) after the report was due to be publicly available in August 2003 it still had not been finalised as at 28 January 2004 (pers. comm., NPWS Library).

This raises serious questions about transparency and accountability of NPWS as well as concerns over delays in any modification of the plan that may be necessary, and ultimately any compromise of management program outcomes.

Modify Management Plan and/or Objectives as Necessary

It is apparent that there are systemic problems within NPWS as evidenced by extensive delays in meeting statutory reporting requirements. This raises serious doubts over the likelihood of a successful outcome for any pest animal management plan.

I appreciate and understand that these shortcomings may merely be symptoms of the *real* problem and *real* cause e.g. chronic and critical under-resourcing of NPWS.

Specific Comments

Finding No. 1

No specific comment

Finding No. 2

No specific comment

Finding No. 3

"Increases have occurred due to deliberate translocations by hunters, escapes from deer farms and as expansions of acclimatization herds (Moriarty 2004)."

Moriarty (2004) estimated that 58% (n=126) of wild deer herds in Australia originate from translocations (deliberate releases) and suggests that a lack of feral game animals to hunt has resulted in a "dramatic increase" in this practice over the last ten years.

While isolated translocations may well have occurred, nowhere in the 2001 reprint of Low 1999 is there any mention of "dramatic increases" in this practice. What Low actually states (on page 220) is this: "*As ostrich and deer farms go broke we may see stock turned free to found new colonies.*"

This inaccurate and liberal interpretation of the literature cited by Moriarty is of concern and raises serious questions about his true motivation.

Escapes from Deer Farms

The emphatic assertion by Moriarty (2004) that "*Today, many farms in Australia continue to have animals escape into the wild*" is not supported by any published or anecdotal reports, very likely because, as far as I am aware, there are none.

It is inherently difficult to verify the frequency and extent of any escapes from commercial deer farms; records are simply not accessible, even if they are kept.

McKnight (1976) indicates that the principle source of most of Australia's feral ungulates is human inattention to their domesticates: "*... escapees from domestication have comprised the major cadres from which feral populations have become established.*"

More recent enquiries (in 2004) to the Rural Industries Research and Development Corporation (RIRDC) and a commercial deer farmer suggest the problem of deer

escaping from commercial farms is not as extensive as is commonly believed (Denholm L and Dowsett I, pers. comm.).

Dr Denholm acknowledges that while deer do occasionally get out (from deliberate malicious action by animal liberation extremists, as a result of domestic dispute or true accidental escape) most escaped deer desperately try to get back into their enclosure. In one particular case, 96% of a herd of 200+ deer that were deliberately turned out following a domestic dispute, returned to their enclosure.

Deliberate Translocations by Hunters

To verify the *estimate* by Moriarty (2004) that 58% (n=76) of the 218 deer herds in Australia originate from deliberate translocation by hunters, I made enquiries to the NSW Attorney General's Department seeking any records of deer 'translocation' offences. These enquiries revealed there have been only two charges relating to offences against the National Parks and Wildlife Act 1974, section 109: "Unlawful liberation of animals". One case in 1992 heard at the Liverpool local court which was proven. The other in 2002, heard at Picton local court which was dismissed (no evidence).

There have been no recorded offences or convictions against the Game and Feral Animal Control Act 2002, section 55: "Offence of releasing animals for the purpose of hunting".

My enquiries did not reveal whether either of the above two cases involved deer. Even if both cases did involve deer, this meagre evidence would not support the *estimates* of Moriarty (2004). It therefore seems reasonable to conclude that deliberate translocation by hunters is unlikely to be a significant contributor to the increase in number of deer herds in Australia.

Expansion of Acclimatisation Herds

It is possible that tightening of gun laws in NSW since 1996, has resulted in a decline in the number of hunters actively pursuing wild deer.

While this might suggest that the increase in new wild deer herds is the result of an expansion of existing herds, caution is warranted. Because of the elusive and secretive nature of wild deer, the lack of accurate records of farm deer escapes, and a wish to avoid prosecution for deliberate translocation, it is extremely difficult to accurately identify the true source of any new wild deer herd.

Bomford (2003) makes the important point (supported by robust scientific evidence) that not all species pose the same level of threat for establishing a new population in the wild. With regard to establishment likelihood, it is suggested that an approximate minimum threshold population of about 20 individuals is required for survival and successful establishment.

"Bioclimatic modeling suggests that all species could increase their distributional ranges further in NSW; for three species...suitable climates are predicted to occur in most or all parts of the State (Moriarty 2004)."

Although climatic matching can provide some indication of a species' potential distribution in Australia, actual distribution will be affected by many factors (competitors, predators, diseases and parasites) and supplies of the essential resources food, water and shelter which are in turn are affected by past and current landuse (Bomford 2003).

For a species that does establish, many factors also contribute to the uncertainty of making reliable predictions about its pest potential.

For Moriarty to therefore suggest that wild deer could increase their present distribution from occupying 5% of NSW (West and Saunders 2003) to "most or all parts of the State" is highly speculative and unsubstantiated.

An assessment of 'Climate Match Score' for each deer species in Australia indicates that there is moderate to low climate match (Bomford 2003, Appendix A).

<u>Species</u>	<u>Climate Match Score*</u>
Fallow deer (<i>Dama dama</i>)	4
Sambar deer (<i>Cervus unicolor</i>)	5
Red deer (<i>Cervus elaphus</i>)	5
Hog deer (<i>Cervus porcinus</i>)	4
Chital deer (<i>Cervus axis</i>)	5
Rusa deer (<i>Cervus timorensis</i>)	2

* 1(lowest) to 6 (highest) climate match score

For comparison, the feral dog, feral pig, feral cat and European red fox all have a Climate Match Scores of 6, indicating that based on climate modeling, deer have lower potential to expand their distribution than these common pest species.

Furthermore, a systematic evaluation of the pest status of deer in Australia indicates that all species except Sambar are not a pest or only a minor pest (Bomford 2003, Appendix B).

<u>Species</u>	<u>Australian Pest Status*</u>
Fallow deer (<i>Dama dama</i>)	1
Sambar deer (<i>Cervus unicolor</i>)	2
Red deer (<i>Cervus elaphus</i>)	1
Hog deer (<i>Cervus porcinus</i>)	1
Chital deer (<i>Cervus axis</i>)	1
Rusa deer (<i>Cervus timorensis</i>)	1

* 1= not a pest or minor pest; 2= moderate pest; 3=serious pest

These data are corroborated by the results of the 2002 survey undertaken by NSW Agriculture's Vertebrate Pest Research Unit in which deer were not perceived as being a major pest species (West and Saunders 2003).

Finding No. 4

"The six species of deer in NSW are primarily grazers, but all species graze opportunistically on the buds, shoots and leaves of trees and shrubs (Bentley 1978)...or other agricultural land (Bentley 1995)."

No specific comment.

Finding No. 5

The NPWS website advises that the Scientific Committee will accept submissions (only) on biological and ecological issues. For the Scientific Committee then to introduce societal issues (damage to fencing / agricultural crops, harassment of stock) is surprising. Presumably this was done in an attempt to provide additional support for the preliminary determination. However, under the terms of section 15 of the Threatened Species Conservation Act 1995, this information is entirely irrelevant.

This raises transparency concerns. Is it the intention of the Scientific Committee to publicly only accept biological and ecological submissions, while privately considering a broader scope of issues, including societal issues?

The Scientific Committee is consists of 11 members of the same ilk; there is no broader community or society representation, which is highly desirable when dealing with politically and socially sensitive issues such as 'deer'. To ensure transparency, and that the procedures and decisions of the Scientific Committee are capable of withstanding public scrutiny, I strongly recommend that an independent observer (community representative) be appointed to attend all Scientific Committee meetings dealing with this proposal, including the review of submissions from stakeholders and interested parties.

Finding No. 6

"Impacts of deer on indigenous biota have been poorly studied."

The *purported* impacts of deer are indeed hard to corroborate because they are just one of many factors such as habitat disturbance / destruction, changed fire or water regimes and recreation activity that are threatening native species in any given area.

This is particularly so when attempting to assess impacts on rare (endangered or threatened) species such as *Acacia bynoeana* or *Persoonia hirsuta* etc.) and, where there are confounding influences such as dietary overlap with native species eg. Rusa Deer and *Wallabia bicolor*.

As English (2002) insists, it is premature and inappropriate to make any determination until the purported impact of pest animals has been thoroughly studied. Feral animals are generally assumed to be a problem in themselves, yet often, further investigation reveals they are merely symptoms of much broader problems.

The paucity of factual information on the effects of wild deer on indigenous biota provides fertile ground for perpetuation of misinformation (Hart 2002). Fictitious

information when repeatedly passed off as fact becomes "truth" – a phenomenon known as Bellman's Fallacy¹.

"However, impacts of feral deer have been documented...creation of trails, concentration of nutrients, exposing soils to erosion/accelerating erosion and subsequent degradation of water quality in creek and river systems (Clarke et al. 2000, NPWS 2002)."

While cloven-hoofed deer will, over time create trails in native vegetation, so too will soft-shod humans. In the mid 1980's I witnessed first-hand a barely discernable track to an isolated and "secret" fishing spot in the Blue Mountains change over the course of 12 months to a prominent track. On one particularly steep pinch above the river, there is now a substantial erosion problem following dislodgment of rocks.

Cyclists too create trails, with accompanying habitat fragmentation and environmental degradation for example in Royal National Park (NPWS 2002b). Despite attempts to restrict riders to fire management trails, there has been a steady increase in riding on non-approved and walking-only tracks, and mountain biking tracks have been, and continue to be cut into the bush. Favoured tracks, on steep down hill sections and rocky outcrops, are the most susceptible to environmental damage and track widening, especially after rain (NPWS 2002b).

A simple calculation shows the collective area of 10 actively promoted walking tracks, cycling tracks, and fire management trails in Royal National Park is conservatively estimated at about 548,000m² (54.8 hectares):

Walking tracks (n=10):	86 km x 1m wide (est.)	= 8.6 hectares
Cycling tracks:	6 km x 2m wide (est.)	= 1.2 hectares
Fire management trails:	150 km x 3m wide (est.)	= <u>45 hectares</u>
		54.8 hectares

All 10 of these walking tracks are actively promoted by NPWS as passing through 'heathlands', 'rainforests', 'woodland', 'coastal rainforest', 'coastal scrub', 'eucalypt forests' and 'closed woodland' (NPWS website, Royal National Park, Walking Tracks). These are some of the very same plant communities that the Scientific Committee asserts are being impacted upon by deer (Finding No. 7). One can only wonder at the relative impact of 'Man' vs 'Deer' on these communities.

Finding No. 7

"In Royal National Park, Rusa Deer have been shown to alter the structure, species abundance and composition of grassland communities (Hamilton 1981)."

It is true that Hamilton (1981) showed that Rusa deer altered the grassland communities in Royal National Park. However, by omitting details of the *direction* of that change in the preliminary determination the Scientific Committee may mislead the casual reader to assume that the changes were all negative. This was certainly not the case. Hamilton observed that at the 'high' deer density site (Era) there was

¹ Bellman's Fallacy (taken from Lewis Carroll's *Hunting of the Snark*: "what I say three times is true") demonstrates how ideas which don't measure up nonetheless are believed through sheer dint repetition. Such ideas can be very difficult to eradicate.

higher plant species diversity at the Control (deer accessible) areas whereas there was a lower plant species diversity in the Treatment (deer enclosure) areas. These observations led Hamilton to conclude that deer are important in *maintaining* plant species diversity on grasslands.

It is fair to say that there are a number of intriguing and potentially confounding aspects to Hamilton's work which warrant further research, for example the presence of rabbits at varying densities at each of his 3 research sites.

"In addition, patches of sandstone heath, woodland and littoral rainforest with high deer density locations in the Park have 30-70 percent fewer plant species than patches with low deer densities (NPWS 2002)."

This statement may well be true. However the Scientific Committee appears to be simplistically assuming a direct causal relationship between deer number and plant species decline. Ecosystems are rarely (never) that simple, and, as indicated in a summary of the myths and misconceptions about pest animal management, it is often incorrectly assumed that pest impact and pest numbers are directly related (<http://www.affa.gov.au>).

The Scientific Committee previously acknowledged that the impact of feral deer on indigenous biota had been poorly studied (Finding No. 6). To implicitly suggest in their very next 'Finding' that deer are directly responsible for the 30-70% fewer plant species in high-deer density locations, is quite frankly incredible and indicates that even professional biologists and ecologists are not immune from the commonly held misconception that "more pests = more impact". This may or may not be true.

"Eight threatened species of plants are eaten by the deer (A Moriarty, unpublished data)."

Again, this statement may well be true. However, it is important to vigorously challenge the unsubstantiated assumption that herbivory of these plant species is undertaken exclusively by deer.

"Grazing and trampling by Rusa Deer could alter the composition and structure of the following Endangered Ecological Communities:- Sutherland Shire Littoral Rainforest, Sydney Freshwater Wetlands, Sydney Coastal Estuary Swamp Forest Complex and Sydney Coastal River Flat Forest."

This assertion by the Scientific Committee is not supported by any cited works, either published, unpublished. It therefore remains mere speculation.

These ecological communities are just as likely to be trampled by the huge onslaught of bushwalkers, bike riders or picknickers that visit Royal National Park every day, as a result of its close proximity to, and easy access by the large population centres of Sydney and Wollongong.

Finding No. 8

"Populations of the following species are not threatened but could be threatened by grazing and environmental degradation caused by feral deer (A Moriarty unpublished data, NPWS unpublished report)."

Again, this is speculation "supported" by unpublished data.

It is clear that this finding was compiled in an attempt to fulfil part (b) section 15 of the Threatened Species Conservation Act 1995, to satisfy the requirements for listing as a key threatening process.

Finding No. 9

"Rusa Deer in Royal National Park show a 13 per cent overlap in diet with the Swamp Wallaby (*Wallabia bicolor* in summer and a 54 per cent overlap in diet in winter (Hamilton 1981)."

Given that there is dietary overlap between Rusa deer and *Wallabia bicolor*, it is entirely likely that any affect on vegetation is at least partly due to *Wallabia bicolor* and cannot be attributed exclusively to Rusa deer.

Hamilton indicates that Rusa deer are "predominantly grazers" and *Wallabia bicolor* are "predominantly browsers". This suggests that the endangered / vulnerable species (all shrubs) cited by the Scientific Committee is perhaps less likely the subject of herbivory by deer. This notion warrants further investigation.

Finding No. 10

"Feral deer are known to occur in many conservation reserves...."

This statement may well be true. However, without indicating any *actual* impact that the deer may be causing to endangered / threatened species in these reserves the statement provides no additional helpful information.

As discussed earlier, it is not the presence of deer *per se* but rather the damage that they may (or may not) be causing to endangered / threatened species that is the subject of a preliminary determination to list deer as a key threatening process.

Finding No. 11

"In view of the above, the Scientific Committee is of the opinion that Herbivory and environmental degradation caused by feral deer adversely affects two or more threatened species, populations or ecological communities and could cause species, populations or ecological communities that are not threatened to become threatened."

Comments on this, the concluding summary of the preliminary determination by the Scientific can be found in the Summary, Conclusion and Recommendations below.

Summary

This preliminary determination is poorly supported by limited and weak scientific data. The Scientific Committee has relied heavily on the work of one author in particular (Moriarty) and much of his work is not peer reviewed, is unpublished or is in-press.

Several comprehensive works especially relevant to this preliminary determination (eg. West and Saunders 2003, Bomford 2003) appear to have been overlooked and by the Scientific Committee. Both of these present robust and well documented evidence; it is disappointing that these important contributions went unconsidered by the Scientific Committee in preparing their preliminary determination.

A number of the findings of the Scientific Committee are based on perpetuation of misinformation and decision making that is based on tradition and emotion rather than on up-to-date research information.

Conclusion

There is no firm basis for approving the proposal to list 'herbivory and environmental degradation caused by feral deer as a key threatening process' at this time.

Recommendations

That:

1. NPWS in collaboration with the Game Council and other stakeholders plan additional research into the impact of wild deer in NSW.
2. NPWS complete recovery plans for all endangered / threatened species mentioned in the preliminary determination as a matter of urgency (several of these species' determinations were gazetted 3-5 years ago).
3. a community representative be included as an observer on all meetings of the Scientific Committee dealing with deer
4. NPWS explore alternative ways to defray the high cost of managing deer on the NSW public estate

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